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ABSTRACT

The degree to which good and poor high school readers comprehend prose was studied in relation to their ability to (1) use passage organization to facilitate comprehension; (2) use task instructions to facilitate comprehension; and (3) answer verbatim and paraphrase items used to measure comprehension. Eleventh grade students were given the Stanford Diagnostic Reading Test, so as to define two groups (good and poor) of comprehenders. The study also employed two versions of a passage and three versions of instructions, followed by a multiple choice test. Results indicated that although students in the good group were not affected by passage structure, students in the poor group were aided by it. Task instructions did not significantly influence either group of readers. However, the poor group did react to both attribute and relation instructions while the good group reacted to only the relation instructions. To give a more detailed picture of what type of information processing occurred during reading, the results are discussed in terms of the verbatim and paraphrase items used to assess comprehension. (Author/GK)

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COMPREHENSION OF PROSE:

STRATEGIES AFFECTING GOOD AND POOR HIGH SCHOOL READERS

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Comprehension of Prose:

Strategies Affecting Good and Poor High School Readers

Objectives

The objectives of this study are to ascertain the degree to which good and poor comprehenders differ in their ability to: (1) use passage organization to facilitate comprehension; (2) use task instructions to facilitate comprehension; (3) answer verbatim and paraphrase items used to measure comprehension.

Theoretical Framework

Reading educators and psychologists have been especially interested in what characteristics of written materials appear to facilitate comprehension of text. One area of research on written materials which has been the focus of considerable attention over the last several years involves the effects of ideational organization of text on the comprehension process.

Mayer (1977) reviewed the literature on text organization as it affects comprehension and found conflicting results. Three studies indicated that this contradictory information may be explained by the degree of familiarity the subjects had with the content of the materials being presented. In a study by Tobias (1973) which was replicated by Dyer and Kulhavy (1974), this appeared to be the case. Tobias (1973) found that logical sequence was important for novel or unfamiliar subject matter, but not for familiar material. The effect of sequence is modified by the subjects' prior familiarity with the content. It appeared that, when the subjects were familiar with the topic, they had a general

outline into which they could fit the material. On new, unfamiliar content, however, subjects were unlikely to have an organizational scheme into which the new information could be fit. Dyer and Kulhavy (1974) reached similar conclusions. They stated that sequence should receive close attention when preinstruction familiarity is low and the material is not redundant.

The organizational characteristics of text have also been studied by grouping sentences according to different schemata. Frase (1973) found that organization by either name or attributes resulted in better comprehension than a random sequence of sentences. Myers, Pezdek, and Coulson (1973) found that a text organized by attributes was better recalled than when it was grouped according to names, while Schultz and DiVesta (1972) found name organization of countries facilitated greater recall than attribute organization. Thus, it is not possible to determine whether name or attribute organization is better, but either is more successful than random organization.

In two experiments, Steingart and Glock (1979) examined the effect of text organization on the comprehension of a concrete prose passage. The first experiment assessed comprehension using multiple-choice questions and the second using written recall. Three types of text organization were used. In the referent organization, all sentences pertaining to an object and its attributes were placed in a single paragraph while in the attribute organization, all sentences pertaining to an attribute were grouped together. In the scrambled organization, the sentences were randomly arranged. The subjects were asked to read the

passage using two strategies (imagery or repetition) to assist them in recall. Regardless of the strategy used, the text having referent organization produced the best comprehension in both experiments. In experiment one, the attribute organization facilitated greater recall than the scrambled organization while in experiment two, the attribute text and the scrambled text did not differ from one another.

The type of information recalled may also be affected by the text organization. Frase (1970) found that logical ordering assisted subjects in drawing inferences. One group of adult subjects learned a text written in logical order while a second group learned a text that was not logically ordered. Although both groups could recall the text, the group that had the logically ordered text could more easily combine information and draw inferences than the other group.

Another group of researchers has studied the effect of task instructions on the ability of students to comprehend material. In this area, Frase (1975) demonstrated that there was a match between learning directions and items learned in a text. His experiment used two sets of learning directions, one set referring to eleven sentences in a passage and the other set to another eleven sentences. In all the experimental groups, there was a significant difference between the information recalled which was relevant to the instructions rather than incidental to the instructions.

A study using learning directions was also done by Rothkopf and Kaplan (1972). They found that specific learning directions

made a significant difference in the amount of material recalled compared with general learning directions or no directions. If there is a match between learning directions and items learned as the above research indicates, directions can be used as a control over learning outcomes.

An experiment involving instructions and text structure was done by Stein and Nezworski (1978). Their subjects listened to stories and answered the questions orally rather than reading them. They found that instructions affected the amount of recall when there was a large discrepancy between text structure and an ideal structure, but the accuracy of recall did not improve with instructions when a story was well formed or when it was only slightly disordered.

There are also studies which suggest that interspersed questions may be used as organizers to aid the students in the retention of prose material. In fact, there is evidence to suggest that questions may have differential effects on students of different abilities (Sanders, 1973; Allen, 1970). Those who have a lower grade point average or a lower IQ tend to benefit more from advance organizers or interspersed questions than those with high grades or IQ. In view of his own research and the evidence in the field, Rickards (1975-1976) suggested that "it would seem fruitful to study the use of interspersed advance organizers or high level questions as aids for such poor readers in the comprehension of reading material" (p. 620).

Some researchers (Ausubel & Fitzgerald, 1962; Shavelson, Berliner, Ravitch, & Loeding, 1974) have found an interaction

effect between verbal ability and the ability to use interspersed questions or advance organizers. In fact, Shavelson et al. (1974) found that while inserted questions in the text appear to aid subjects with low vocabulary scores, they may interfere with prose learning for those students with high verbal ability.

Mayer's 1978 study found an interaction effect between text organization and advance organizers. He found that given an advance organizer, subjects reading a poorly organized text could perform better on a posttest than control subjects, but there was no positive effect for advance organizers used with logically organized text.

A summary of research which addressed the topic of the relationship between aptitudes and reading comprehension was done by Perfetti and Lesgold (1977). Their own study and their comprehensive review of other studies focused on the processes that readers employ in order to understand discourse. They contrasted skilled and less skilled readers. The three areas of possible individual differences in discourse comprehension which the researchers examined were (a) use of discourse structure, (b) short-term memory capacity, and (c) verbal coding speed. They concluded that skilled comprehension depends on short-term memory capacity and verbal coding speed. While the researchers suggested that skilled and less skilled comprehenders may differ on structure-related strategies, they could find no structure that presented a direct problem to less skilled readers.

In terms of memory capacity, the speed of retrieving word meanings is the source of difference between good and poor

comprehenders. Less skilled readers are slower and less efficient in the encoding and decoding of information in short-term memory. The ability of skilled readers to use thematic information is important to overcome the limitations of short-term memory.

In addition to the above researchers, there are recent comprehension studies that sample from two or more populations in order to examine what makes some students better comprehenders than others. Comprehension studies which sample from stratified populations have been conducted by Drum (1979) and by Ryan and Willows (1979) on the elementary level and by Marshall and Glock (1978-1977) on the college level. They suggest that research which examines variance due to stratified sampling may yield important results.

Method and Data Source

Students in the eleventh grade were given the Stanford Diagnostic Reading Test, Brown Level, Test 2: Reading Comprehension. On the basis of the results of this test, two groups were formed. The "good" group was defined as those students who had received grade equivalent scores between 8.5 and 11.5 The "poor" group was defined as those students who had received grade equivalent scores between 3.5 and 7.5. One hundred and twenty students (60 good and 60 poor) participated in the final experiment. The subjects in each of the two groups were randomly assigned to one of six treatment conditions.

In addition to the distinction between good and poor readers, the study employed two versions of a passage and three versions of instructions. The passage used was chosen from In the Shadow of

Man by Jane Van Lawick-Goodall. The first form of the passage called the "Original Passage" was exactly as it appears in the book. The second form called the "Reorganized Passage" was rewritten with an emphasis on the ideational organization of the text. The outline used to construct this passage consisted of the following four ideas listed in the order in which they occur: (1) friends and their characteristics, (2) friends who are siblings, (3) the effect of friendship on position in the social structure, and (4) the effect of friendship as a means of emotional support.

For instance, in the "Original Passage" one paragraph discussed two pairs of chimpanzees who were friends, and how one pair had attained their position in the social structure of the community. Another pair of friends was discussed in a paragraph that occurred later in the passage. In the "Reorganized Passage," each of the three pairs of chimpanzees who were friends were discussed in a single paragraph. How the chimpanzees attained their position in the social structure of the community was discussed later in the passage. When possible the same words and sentences were used in the "Reorganized Passage" as were used in the original text. The readability level of both passages was 9-10th grade as determined by the Dale Chall formula (1948).

The following three sets of task instructions were used: (1) Attribute Instructions which told the subjects the general composition of the passage and asked them to pay particular attention to the attributes of chimpanzees and of friendships; (2) Relation Instructions which told the subjects the general composition

of the passage and asked them to pay particular attention to the effects of relationships on life in the chimpanzee community; and (3) Control Instructions which told the subjects the general composition of the passage.

To assess comprehension of the passage, a multiple-choice test was given to each subject. The items were constructed according to the procedures recommended by R. C. Anderson (1972). He described methods for generating several types of verbatim and paraphrase items to assess comprehension. Verbatim questions asked the subject to recall points that are explicitly stated by the author. Paraphrase questions asked the subject to summarize a main idea, classify a subject, or recognize new examples of incidents in the passage. The two conditions that a paraphrase item met were that it did not have any substantive words in common with the original text and that it was equivalent in meaning. Distinguishing between verbatim and paraphrase items gave a more detailed picture of what type of information processing is occurring.

In a pilot study, a thirty-five item multiple-choice test was given to a group of good and poor comprehenders as defined in the study. An item analysis was performed to determine (a) the success of the group on each item (what per cent got it right); and (b) the discriminating power of each item (based on how many high-scoring than low-scoring students got it right). On three items, fewer than thirty per cent of the group members scored correctly and these items were discarded as being too difficult. On one item, more than ninety per cent of the group members

scored correctly and it was discarded as being too easy. Five items were judged as being non-discriminating and they were discarded. Also, a single distractor on one question was revised because it caused the item to be non-discriminating.

The thirty-five multiple-choice items were, also, given to thirty students who had not read the passage. This was done to ascertain whether the items were passage dependent. Six items were answered correctly by more than forty per cent of the students without reading the passage. They were discarded from the test. Anderson and Biddle (1975) found that students could get thirty-four per cent of both verbatim and paraphrase multiple-choice items correct without reading the passage.

Results

The first treatment examined the effects of passage organization on the ability of good and poor readers to acquire information from a prose passage. In this treatment, the independent variables were Comprehension Ability (good or poor) and Passage Organization (original or reorganized). The dependent variable was the proportion of all items correct on the comprehension measure.

The 2(Passage Organization) X 2(Comprehension Ability) analysis of variance for this treatment is summarized in Table II. The analysis yielded a significant main effect for organization of the passage, $F(1,116) = 7.91$, $p < .01$, and for comprehension ability of the reader, $F(1,116) = 251.30$, $p < .001$. The interaction was significant, $F(1,116) = 9.89$, $p < .01$. An analysis of simple effects indicated that there was a significant difference

between the good and poor readers on both the reorganized passage, $F(1,116 = 80.75$, $p<.001$, and the original passage, $F(1,116) = 180.44$, $p<.001$. Within the comprehension ability factor, there was no significant difference between the good readers receiving the reorganized passage and the good readers receiving the original passage, $F(1,116) = .055$, but the poor readers receiving the original passage obtained significantly lower scores, $F(1,116) = 17.74$, $p<.001$, than the poor readers receiving the reorganized passage. For a graphic display of the effects of passage organization on good and poor readers, see Figure 1.

The second treatment examined differences in the ability of good and poor readers to answer verbatim and paraphrase items used to measure comprehension. In this treatment, the independent variables were Comprehension Ability (good or poor) and Level of Comprehension (verbatim or paraphrase). The dependent variable was the proportion of the verbatim or paraphrase items correct.

The 2(Level of Comprehension) X 2(Comprehension Ability) analysis of variance is summarized in Table III. The analysis yielded a significant main effect for level of comprehension (verbatim or paraphrase questions), $F(1,236) = 9.07$, $p<.01$, and for comprehension ability of the reader (good or poor), $F(1,236) = 317.03$, $p<.001$. The interaction between level of comprehension and comprehension ability predicted was not supported, $F(1,236) = 0.17$, NS. The good and poor comprehenders did not differ in the degree to which they were able to answer verbatim and paraphrase questions. However, the evidence

indicated that for both groups of readers paraphrase items were more difficult to answer than verbatim items.

The final treatment examined the effect of written task instructions on the ability of good and poor readers to comprehend text. With the passage students received one of the following instructions: (1) attribute instructions which cued the reader to the attributes of chimpanzees and of friendships; (2) relation instructions which cued the reader to the effects of relationships on life in the chimpanzee community; and (3) control instructions. The results from this treatment will be discussed in two parts--attribute items correct and relation items correct.

In part one, attribute items correct, the independent variables were Comprehension Ability (good or poor) and Task Instructions (cued to attributes of chimpanzees, cued to relations of chimpanzees, or control). The dependent variable was the proportion of attribute items correct. A 2(Comprehension Ability) X 2(Task Instruction) analysis of variance, summarized in Table IV, yielded a significant main effect for comprehension ability of the reader (good vs. poor), $F(1,114) = 162.26$, $p<.001$, but no effect for task instructions, $F(2,114) = 1.90$, NS, or for the interaction of ability and instructions, $F(2,114) = 2.38$, NS. It was predicted that comprehension scores for good readers would not differ significantly across task instructions. The data supported this prediction. It was also predicted that poor readers would score differently according to the task instructions they received. Since there was no interaction effect, the findings did not support this prediction. An examination of mean scores

for the poor readers (see Table I) indicates a general pattern in the predicted direction. Poor readers receiving attribute instructions scored higher than those receiving either relation instructions or control instructions. This difference was not significant, however.

In part two, relation items correct, the independent variables were Comprehension Ability (good or poor) and Task Instructions (cued to attributes of chimpanzees, cued to relations of chimpanzees, and control). The dependent variable was the proportion of the relation items correct. A 2(Comprehension Ability) X 2(Task Instruction) analysis of variance yielded a significant main effect for comprehension ability of the reader $F(1,114) = 167.48$, $p<.001$. There was also a significant main effect for task instructions, $F(2,114) = 4.34$, $p<.05$. This analysis is summarized in Table V.

The significant main effect for task instructions indicated that all students receiving the relation instructions scored higher on the relation items of the comprehension test than students receiving the attribute instructions or the control instructions. Probing with the Neuman-Keuls procedure revealed that differences between relation items ($M = 72.25$) and control items ($M = 61.75$) as well as relation items ($M = 72.25$) and attribute items ($M = 64.00$) were significant ($p<.05$), with the relation items being higher in both cases. These results suggest that there was a match between learning instructions and the items learned in a passage.

It was predicted that the scores for the good readers would

not differ significantly according to the task instructions that they received. An examination of mean scores for good readers (see Table I) indicates that mean scores for relation instructions were higher than those for attribute or control instructions. A one-way analysis of variance was used to compare the proportion of relation items correct for each of the three types of instructions given to the good readers. The results are shown in Table VI. The F score of 2.70 was not significant at the .05 level (its probability being .08). Although there was a trend apparent in the scores for the good readers, the sample means did not differ significantly from one another.

It was predicted that poor readers would score differently according to the task instructions that they received. An examination of mean scores for the poor readers (see Table I) indicates a general pattern in the predicted direction. Poor readers receiving the relation instructions scored higher than those receiving either attribute or control instructions. The analysis summarized in Table V indicates that the interaction between comprehension ability and relation task instructions was not significant, $F(2,114) = .18$, NS. Since there was no interaction effect, the findings did not support this prediction.

Discussion

In treatment one, poor comprehenders were affected by the organization of a text while good comprehenders were not. Apparently, the good comprehenders did not rely on the organization of a passage to obtain information from the text. Indeed, Perfetti and Lesgold (1977) argue that skilled readers have the ability to provide a structure to information in short-term

memory. This ability to use thematic information is important. As a result the information is quickly and accurately retrieved. Poor comprehenders, on the other hand, appear to lack this ability.

This interpretation must be qualified by two features of the passage used in this study. First, the differences in organization between the two passages were not large. Information in the "Reorganized Passage" was simply more carefully ordered than information in the "Original Passage." Second, the passages were short--approximately 950 words. In longer passages with greater differences in organization, effects on the performance of good readers might have appeared. On the other hand, poor readers appear to be affected by even slightly unordered passages.

In treatment 2, the effect of verbatim and paraphrase questions on the performance level of good and poor comprehenders was examined. When the questions required subjects to recognize explicit or verbatim information from the passage, both good and poor comprehenders produced significantly more correct answers. Although performance by the good readers was substantially better than that of the poor readers on both the verbatim and paraphrase questions, the paraphrase questions proved to be more difficult for the good group as they were for the poor group. The difference between the total mean scores on the good reader's verbatim and paraphrase questions was 5.83 while the difference between the total mean scores on the poor readers verbatim and paraphrase questions was 7.66. In other words, the distance between the scores on the two types of questions for both groups was similar.

These results are consistent with Frase's (1970, 1971)

finding that subjects have more difficulty remembering inferential material (combined text information) than text assertions on recognition tests. Anderson and Biddle (1975) also found that subjects attained significantly higher verbatim than paraphrase scores for questions asked immediately after reading a passage. However, Anderson and Biddle found in addition that after a one week interval there was a greater decline in verbatim scores than in paraphrase scores. They hypothesized that there are at least two types of memories: a close-to-surface memory code with a relatively short life; and, a more permanent memory code requiring a greater degree of text processing.

In treatment 3, the effects of written task instructions on the ability of good and poor readers to comprehend text were examined. The results indicate that task instructions had a significant main effect in part two (relation instructions) of the treatment, but not in part one (attribute instructions). For all groups combined, subjects receiving relation instructions scored significantly higher on the relation items of the comprehension measure than those receiving attribute or control instructions. On the other hand, subjects receiving the attribute instructions did not score differently on the attribute items of the compresion measure than those receiving the relation or control instructions. When the two groups of readers were examined independently, the task instructions did not have a significant effect in either part of this treatment.

Although there were no significant results within the good or poor groups of readers, there were two strong tronds in the

data that warrant examination. First, in both part one and part two of this treatment, the poor comprehenders were sensitive to task instructions. In part one, poor readers receiving written attribute instructions scored higher on the attribute items of the comprehension measure than those receiving relation or control instructions. There was little difference in the scores of the latter two groups. In part two, the poor readers receiving written relation instructions scored higher on the relation items on the comprehension measure than those receiving attribute or control instructions. Again the latter two groups performed at nearly equal levels.

Second, the good readers were sensitive to task instructions in part two of this treatment but were not affected in part one. In part two, good readers receiving written relation instructions scored higher on the relation items of the comprehension measure than those receiving written attribute or control instructions. The latter two groups had lower and similar scores on the relation items. Also in part two, the variance on the relation items of the comprehension measure for the good readers receiving the relation instructions was smaller than the variance for the good readers receiving the control instructions. In part one, the task instructions did not affect the scores of the good readers and variance was uniform across instructions.

From one perspective, these findings appear contrary to those which support task instructions as a means to increase comprehension under certain conditions (Frase, 1975; Rothkopf & Kaplan, 1972; Stein & Nezworski, 1978). A possible explanation for this

contradiction may be that general directions were used in the present study. Rothkopf and Kaplan (1972), for instance, found that specifically stated objectives produced more learning than generally stated objectives.

The results would seem to offer interesting possibilities for further research if they are interpreted within an information processing framework. The pattern in the data for poor readers indicates that they were reacting, although to a limited degree, to the task instructions and were using this information to process the text. However, the results for good readers suggest that they encode attributes as a natural part of reading but only encode relations when they are specifically told to do so, i.e., instructions. There are two qualifications that must be placed on this interpretation. First, the text used may have sensitized good readers to attributes rather than relations. Second, the mean score for good controls on the attribute items was 89.0 and for good controls on the relation items was 81.5. The attribute items may simply have been easier, thus weakening any specific effect for attribute instructions.

These results suggest tentatively that poor readers benefit in some small measure at least from task instructions. Good readers, on the other hand, benefit from task instructions only for information they might normally miss. These possibilities represent a provocative are for further research.

In summary, the acquisition of knowledge in most school situations depends on the student's ability to comprehend text. One of the important tasks of educators must, therefore, be to

assist students of varying abilities in gaining knowledge from prose more efficiently. The results of this study are important in three respects. First, the findings suggest that good readers are not easily affected by text organization, but poor readers may be aided in comprehension by slight improvements in the organization of the text. Teachers, therefore, must be especially careful in preparing materials for poor readers. Second, the fact that both good and poor readers had more difficulty answering the paraphrase items than the verbatim items of the comprehension measure indicates that all students need more assistance and practice in drawing inferences from the text. Third, written instructions may be a weak aid for increasing the comprehension of poor readers and may help good readers attend to information they would normally miss. Further study of how written instructions can be designed to influence comprehension would seem to be an important area for helping teachers improve student achievement.

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TABLE I

GROUP MEANS AND STANDARD DEVIATIONS FOR PASSAGE, QUESTIONS, AND INSTRUCTION SCORES

		Reader Types	
		Good (n=60)	Poor (n=60)
Passage Types			
Reorganized Passage	M	87.00	55.00
	SD	11.50	16.82
Original Passage	M	87.83	40.00
	SD	10.06	15.65
Question Types			
Verbatim Questions	M	90.33	51.33
	SD	9.56	20.38
Paraphrase Questions	M	84.50	43.67
	SD	14.90	21.86
Instruction Types			
Attribute Items Correct			
Attribute Instructions	M	88.50	58.00
	SD	12.68	17.95
Relation Instructions	M	89.50	43.50
	SD	12.34	21.59
Control Instructions	M	89.00	45.00
	SD	12.10	23.28
Relation Items Correct			
Attribute Instructions	M	85.00	43.00
	SD	11.00	19.49
Relation Instructions	M	91.00	53.50
	SD	10.21	18.72
Control Instructions	M	81.50	42.00
	SD	16.94	21.18

TABLE II

ANALYSIS OF VARIANCE SUMMARY TABLE FOR PASSAGE ORGANIZATION

Source	df	Mean Square	F	P
Passage Organization	1	1505.21	7.91	.006
Comprehension Ability	1	47800.21	251.30	.000
Organization X Ability	1	1880.21	9.89	.002
Within	116	190.21		
Total	119			

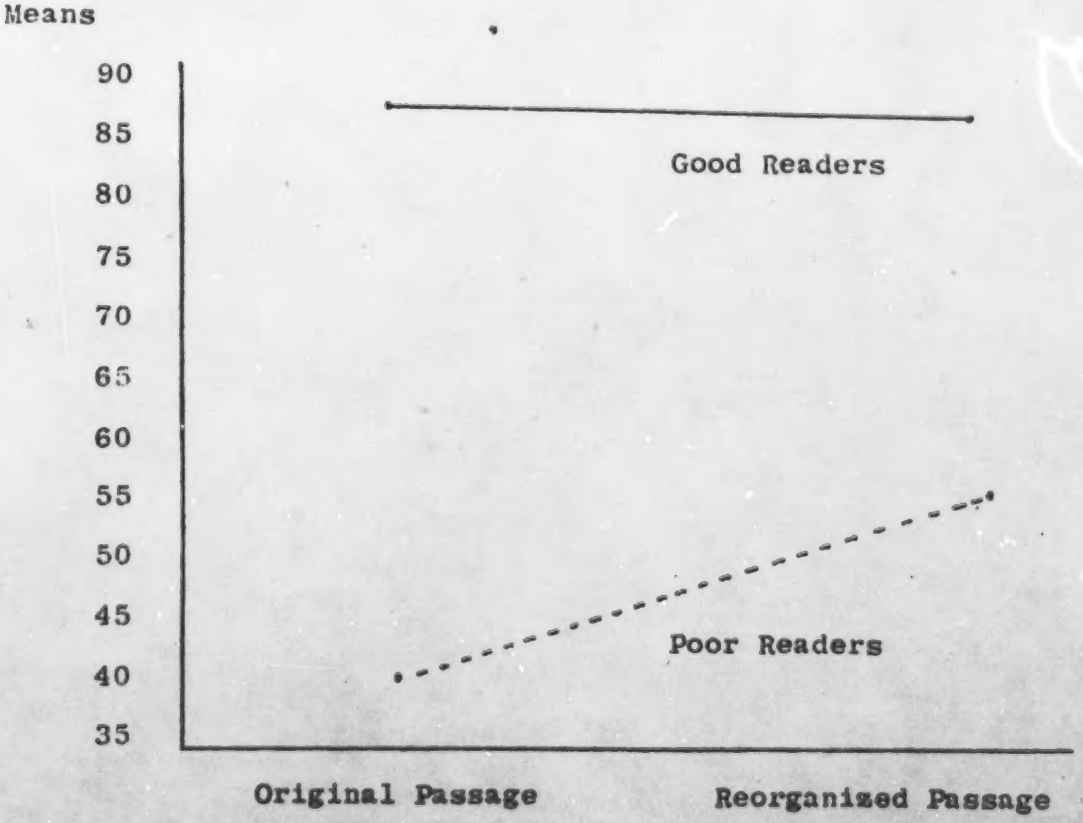

Fig. 1--The effects of passage organization on good and poor reader's ability to acquire information from a prose passage.

TABLE III

ANALYSIS OF VARIANCE SUMMARY TABLE FOR
LEVEL OF COMPREHENSION

Source	df	Mean Square	F	P
Level of Comprehension	1	2733.75	9.07	.003
Comprehension Ability	1	95600.42	317.03	.000
Level X Ability	1	50.42	0.17	.683
Within	236	301.55		
Total	239			

TABLE IV

ANALYSIS OF VARIANCE SUMMARY TABLE FOR
ATTRIBUTE TASK INSTRUCTIONS

Source	df	Mean Square	F	P
Attribute Task Instructions	2	565.83	1.90	.155
Comprehension Ability	1	48400.83	162.26	.000
Instructions X Ability	2	710.83	2.38	.097
Within	114	298.29		
Total	119			

TABLE V

ANALYSIS OF VARIANCE SUMMARY TABLE FOR
RELATION TASK INSTRUCTIONS

Source	df	Mean Square	F	P
Relation Task Instructions	2	1222.50	4.34	.015
Comprehension Ability	1	47203.33	167.48	.000
Instructions X Ability	2	50.83	0.18	.835
Within	114	281.84		
Total	119			

TABLE VI

ANALYSIS OF VARIANCE SUMMARY TABLE FOR
RELATION ITEMS CORRECT
OF GOOD READERS

Source	df	Mean Square	F	P
Between Groups	2	461.68	2.70	.076
Within Groups	57	170.79		
Total	59			